

**REMARKS**

The applicant respectfully requests reconsideration in view of the following remarks.

Support for amended claim 1 can be found in the specification in paragraph no. 12 of the published specification (US 2006/0046092). No new matter has been added.

Claims 1, 2, 8, and 14 stand rejected, and claim 25 is rejected, under 35 U.S.C. 102(b) as being anticipated by Peng et al (Acta Polymerica, 1998) for reasons mailed in Office Action of August 17, 2009. Claims 1-4, 8, 9, and stand rejected, and claim 25 is rejected, under 35 U.S.C. 102(e) as being anticipated by Frey et al (WO 02/095841 A2) for reasons mailed in Office Action of August 17, 2009. **The Examiner is correct that the applicant's priority document does not anticipate Fry because Fry's PCT published in English.** Claims 1-9 and 14 stand rejected, and claim 25 is rejected, under 35 U.S.C. 103(a) as being unpatentable over Frey et al further in view of Hu et al (US6,479,172 B2) for reasons mailed in Office Action of August 17, 2009. The applicant respectfully traverses these rejections.

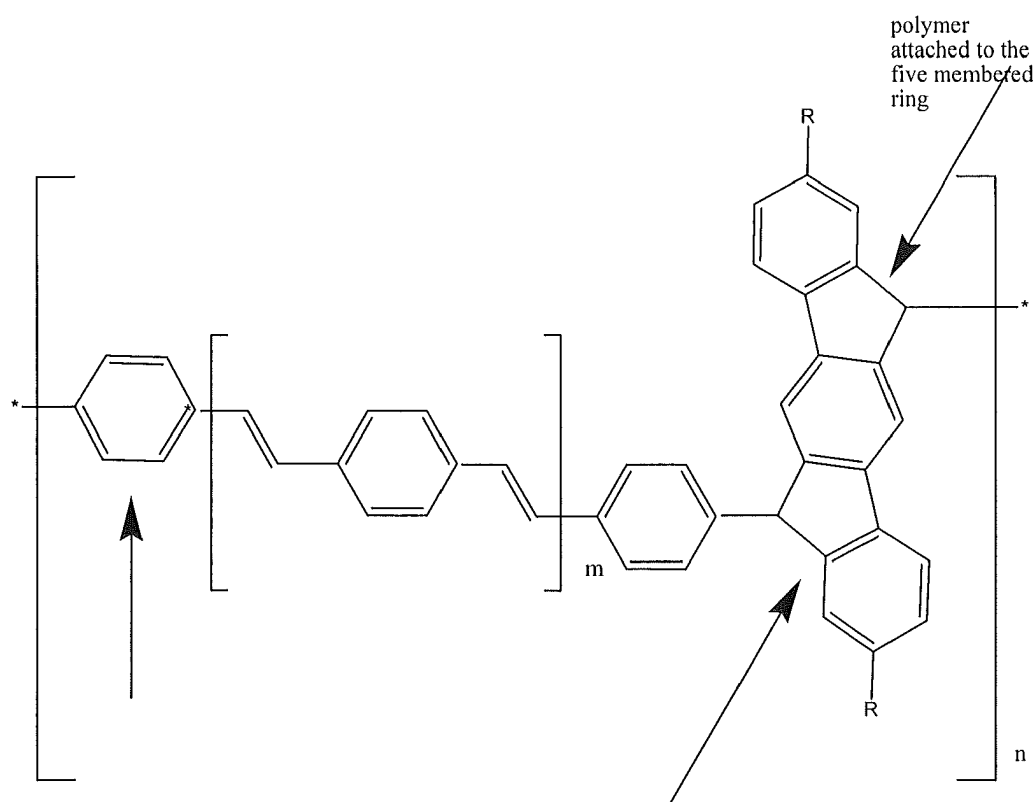
**Rejections under 35 U.S.C. 102(b)**

Claims 1, 2, 8, and 14 stand rejected, and claim 25 is rejected, under 35 U.S.C. 102(b) as being anticipated by Peng et al (Acta Polymerica, 1998) for reasons mailed in Office Action of August 17, 2009. At page 4 of the Office Action, the Examiner stated that the rejected claims do not explicitly limit how the repeat unit of formula (I) is incorporated into the polymer chain. The applicant has amended claim 1, to make it clear where formula (I) is incorporated into the polymer.

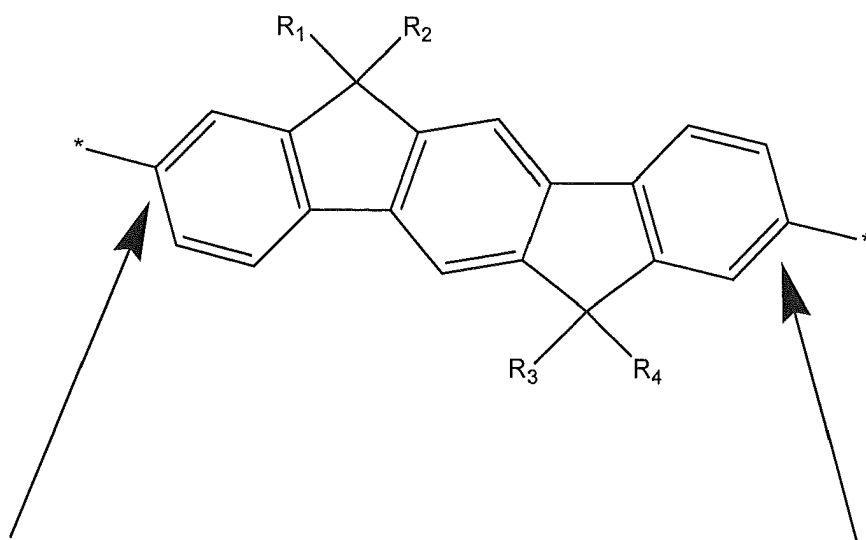
Again, as stated in the last response, the indenofluorene unit according to Peng is incorporated into the main chain of the polymer via the two rings containing 5 carbon atoms,

which are not aromatic, whereas the indenofluorene unit according to the present invention is incorporated into the main chain of the polymer via the two terminal aromatic rings (which contain 6 carbon atoms).

Again, Peng discloses that the polymer is attached to the 5 membered ring as indicated with the arrow below.



However, as stated above the applicant's claimed invention discloses that the main chain is attached to the six-membered aromatic ring and not the five-membered non-aromatic ring.



wherein \* indicates the position that formula (I) is bonded to the polymer chain.

Therefore, Peng does not anticipate the applicant's claimed invention. For the above reasons, this rejection should be withdrawn.

### **Rejections Over Frey**

Claims 1-4, 8, 9, and stand rejected, and claim 25 is rejected, under 35 U.S.C. 102(e) as being anticipated by Frey et al (WO 02/095841 A2) for reasons mailed in Office Action of August 17, 2009. Claims 1-9 and 14 stand rejected, and claim 25 is rejected, under 35 U.S.C. 103(a) as being unpatentable over Frey et al further in view of Hu et al (US6,479,172 B2) for reasons mailed in Office Action of August 17, 2009.

The Examiner is correct that Frey is applicable prior art. As stated above, the undersigned inadvertently argued Frey's publication date and NOT the PCT filing date (since Frey published in English).

It is correct, as stated by the Examiner, that Frey's conjugated unit of formula (IX) encompasses the repeat unit of the present formula (I), but Frey does not explicitly disclose an example which meets the following:

- an indenofluorene unit (i.e.  $Z^2$  and  $Z^3$  are  $C(R^4)(R^5)$ ),
- an indenofluorene unit, which is incorporated into the polymer chain via the 4,4'-position (as claimed in pending claim 1 of the present application), and
- an indenofluorene unit having the specific substitution scheme, as claimed in pending claim 1 of the present application, according to which **R<sub>1</sub>-R<sub>4</sub> are non-hydrogen substituents** (alkyl, alkyloxy, aryl, aryloxy, heteroaryl or heteroaryloxy groups, and  $R_1$  and  $R_2$  and / or  $R_3$  and  $R_4$  may be linked to form a monocyclic or polycyclic, aliphatic or aromatic ring system) and
- at least one of  $R_1$ - $R_4$  comprises an aryl or heteroaryl group".

Frey discloses that  $Z^2$  and  $Z^3$  can be the same or different and is selected from the group consisting of O, S, SO, SO<sub>2</sub>, NR<sub>3</sub>, N<sup>+</sup>(R<sup>3'</sup>)(R<sup>3''</sup>), C(R<sup>4</sup>)(R<sup>5</sup>), Si(R<sup>4'</sup>)(R<sup>5'</sup>) and P(O)(OR<sup>6</sup>). Not only does  $Z^2$  have to be a C(R<sup>4</sup>)(R<sup>5</sup>) but so does  $Z^3$ . In addition, Frey does not require that the indenofluorene unit, which is incorporated into the polymer chain via the 4,4'-position. Frey can incorporate the indenofluorene unit in the 2, 3, 4 or 5 position on either side of the unit. Frey does not require each  $R_1$ - $R_4$  is a non-hydrogen substituent selected from alkyl, alkyloxy, aryl, aryloxy, heteroaryl or heteroaryloxy groups, and  $R_1$  and  $R_2$  and / or  $R_3$  and  $R_4$  may be linked to form a monocyclic or polycyclic, aliphatic or aromatic ring system. Lastly, Frey does not require at least one of  $R_1$ - $R_4$  comprises an aryl or heteroaryl group.

The applicant's invention is to a very specific indenofluorene unit and could be considered a "selection invention" For the reasons stated above, Frey requires too much manipulation for an anticipation rejection.

Hu only discloses so called "small molecules" and no polymers and furthermore do not disclose units of formula (I) of the present application ("wherein at least one of  $R_1$ - $R_4$  comprises an aryl or heteroaryl group") (see compounds (II-1) –(II-24). Therefore, the combination of Frey with Hu does not lead to the applicant's invention.

The advantages of the polymers of the present application are clearly demonstrated in the 1.132 Declaration, which has been executed on July 16, 2008. These results are not obvious for a person of ordinary skill in the art. The Examiner stated in the middle of page 5 of the final office action that the declaration was not commensurate in scope with the applicant's claimed invention. The applicant has amended the claims and believes that the declaration is commensurate in scope with the amended claims.

Due to the suggested amendment, the simplest (Examiner's terminology) polymer structure according to the present invention is no longer a homopolymer consisting of repeat units represented by formula (I) wherein each of three of  $R_1$ - $R_4$  is hydrogen and one of  $R_1$ - $R_4$  comprises an aryl or heteroaryl group (see the last paragraph at page 5 of the final office action), but it is now a homopolymer consisting of repeat units represented by formula (I) wherein each of three of  $R_1$ - $R_4$  is alkyl, alkyloxy, aryl, aryloxy, heteroaryl or heteroaryloxy groups, and  $R_1$  and  $R_2$  and / or  $R_3$  and  $R_4$  may be linked to form a monocyclic or polycyclic, aliphatic or aromatic ring system and one of  $R_1$ - $R_4$  comprises an aryl or heteroaryl group. The synthesis of such a polymer is described in the Rule 132 Declaration (example 4).

The closest prior art for this polymer is a homopolymer consisting of repeat units of formula (I) wherein all of  $R_1$ - $R_4$  are alkyl groups. Polymers having such repeat units are known in the prior art, as can be seen from the specification of the present application (page 2, lines 19-23). The synthesis of such a homopolymer is also described in the above-mentioned Rule 132 Declaration (comparative example 2).

Contrary to the opinion of the examiner, the applicant believes that the comparison of both homopolymers shows unexpected results:

Both homopolymers (i.e. polymer of example 4 and polymer of comparative example 2) only differ in that one alkyl group has been replaced by one aryl group. Surprisingly, such a minor structural difference leads to a major difference with respect to the properties of the polymers. The homopolymer of example 4 has a glass transition temperature  $T_g$  which is 49°C (!) higher than the  $T_g$  of the homopolymer of comparative example 2. These results are clearly unexpected. For the above reasons, this rejection should be withdrawn.

In view of the above, applicant believes the pending application is in condition for allowance.

Applicant believes no additional fee other than for the extra claim is due with this response. However, if a fee is due, please charge our Deposit Account No. 03-2775, under Order No. 14113-00039-US from which the undersigned is authorized to draw.

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Respectfully submitted,  
Electronic signature: /Ashley I. Pezzner/  
Ashley I. Pezzner  
Registration No.: 35,646  
CONNOLLY BOVE LODGE & HUTZ LLP  
1007 North Orange Street  
P. O. Box 2207  
Wilmington, Delaware 19899-2207  
(302) 658-9141  
(302) 658-5614 (Fax)  
Attorney for Applicant